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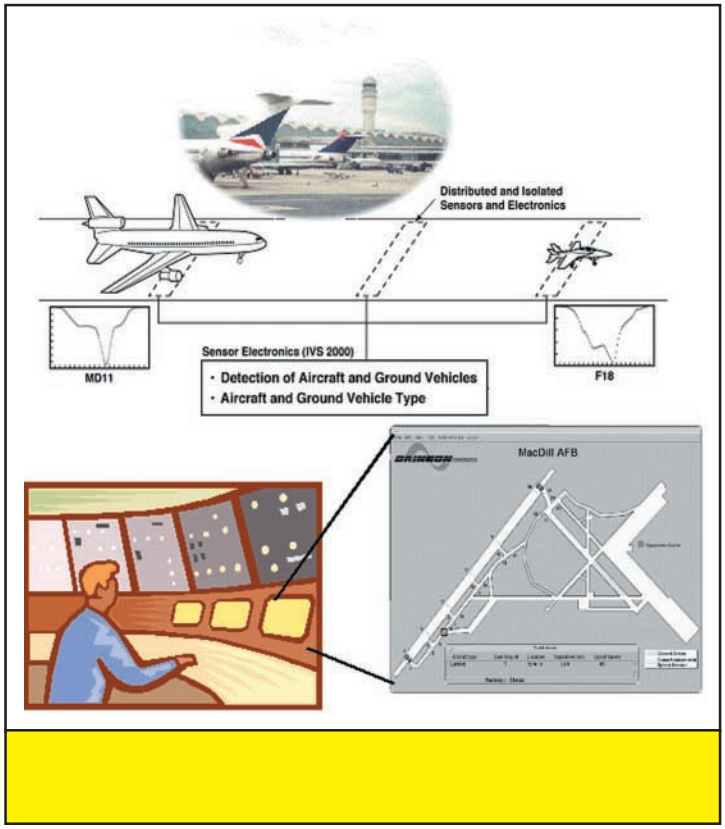
Science and Technology for Tomorrow's Aerospace Forces

Success Story

AFRL PROGRAM ENHANCES AIRPORT GROUND SAFETY



At a time when airline passengers may face as much danger on the ground as in the air, the Information Directorate demonstrated that 25-year-old highway monitoring technology can enhance ground safety at the nation's airports. The busiest airports around the country are experiencing a dramatic increase in the number of aircraft on runways and taxiways, in addition to a variety of service vehicles around terminals and under airplane wings. The development of extended simple traffic light sensors performing advanced ground vehicle safety protection can solve the congestion problem.

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Accomplishment

Engineers at the directorate and Orincon Corporation of San Diego, California, demonstrated the use of inductive loop sensors as an affordable and reliable ground surveillance and tracking system for airfields. Orincon's Ground Safety Tracking and Reporting System (GSTARS) test involved a simulation of a potentially disastrous runway collision in which one aircraft pulled into the path of another cleared for takeoff. Sensors in the runway successfully picked up identification, location, speed, and direction information, and then fed the data into a central computer in the air traffic control tower. The GSTARS computer recognized the potential for a collision and warned air traffic controllers.

Previously, engineers used loop sensors to detect, count, and identify vehicles on highways for traffic light control. GSTARS uses this same basic technology to provide detailed information about aircraft and vehicles on runways. GSTARS detects, characterizes, and tracks aircraft, fuel trucks, and other ground vehicles on runways and taxiways in all weather conditions.

The system fuses the sensor data together to identify the potential for collisions and alerts the control tower in time to prevent mishaps. The system also enhances security by recognizing unauthorized vehicles. GSTARS can augment existing ground radar by eliminating blind spots and clarifying ambiguous readings that occur through multi-path interference.

Background

Orincon combined standard inductive loop sensors with their signal processing and neural network technologies to allow GSTARS to classify a vehicle in one of more than 20 different categories, as well as accurately estimate vehicle speed and length. Engineers can install the system for about one-tenth the cost of a current ground radar system, offering additional savings in maintenance.

The system is especially valuable in situations where a controller cannot visibly monitor the runway due to obstructions, poor weather conditions, or darkness. The system can also assist controllers responsible for monitoring activity at "uncontrolled" airstrips that may be several miles away from a control tower.

Information
Technology Transfer

Additional information

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